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(54) **Gripper, in particular for holding containers**

(57) Gripper (1), in particular for holding containers, of the type comprising a pair of mutually facing jaws (2), fastened to a support structure (3) and movable between a first operative configuration of holding the containers and a second operative configuration of releas-

ing the containers. The gripper (1) originally comprises at least a rigid element (4) to connect said jaws (2) kinematically and allow its substantially simultaneous and controlled operation. Said rigid element (4) is substantially a connecting rod having each of its ends hinged to a corresponding jaw (2).

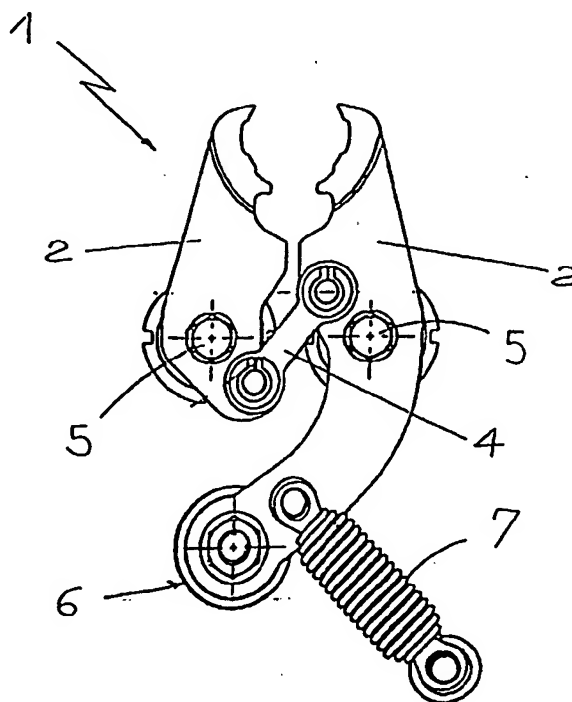


FIG. 3

Description

[0001] The present invention relates to a gripper, in particular for holding containers, of the type comprising a pair of mutually facing jaws, fastened to a support structure and movable between a first operative configuration for holding the containers and a second operative configuration for releasing said containers and actuating means operatively active on at least one of said jaws.

[0002] In bottling plants, rotary machines are provided, such as filling and/or rinsing machines, fitted with a plurality of stations positioned on the periphery of a carousel and each equipped with a gripper, in such a way that they can simultaneously process a plurality of containers.

[0003] DE29501897 discloses grippers for a star conveyor constituted by jaws that open and close with motions in a horizontal plane, operated by a command device comprising a cam able to rotate between the counter-braces of the jaws to spread them or to allow them to approach each other if a return is present which tends to bring the jaws to the opened position.

[0004] The grippers briefly described above suffer from the drawback of having a very complex device for actuating the jaws.

[0005] Also known are grippers constituted by substantially automatic gripping elements, which do not need to be opened or closed by means of springs or cams. Said gripping elements are so shaped as to comprise a dual pair of jaws able to grip the bottles in the mouth area below the neck and in the central area of the body.

[0006] During the operation of the plant, the containers are forced to enter the jaws slightly forcing them to open in automatic fashion, whilst the same containers are forced to exit the jaws by a conventional star conveyor.

[0007] The grippers briefly described above suffer from the drawback of having a rather complex gripping element formed by a dual pair of jaws which are also completely unsuited for gripping containers made of plastic material, such as PET bottles. Such bottles cannot tolerate a grip on the central part of the body, with its poor rigidity, or a grip below the neck as in the solution described above.

[0008] An aim of the present invention is to eliminate the aforesaid drawbacks making available a gripper, in particular for holding containers, that is structurally simple and easy to operate.

[0009] Another aim of the present invention is to propose a gripper that is able to hold containers made of any materials, with particular regard for PET and glass.

[0010] Said aims are fully achieved by the gripper, in particular for holding containers, of the present invention, which is characterised by the contents of the claims set out below and in particular in that it comprises at least a rigid element in order kinematically to connect

the jaws and allow a substantially simultaneous and controlled actuation thereof.

[0011] This and other characteristics shall become more readily apparent from the description that follows of a preferred embodiment illustrated, purely by way of non limiting example, in the accompanying drawing tables, in which:

- Figure 1 shows an axonometric view of a gripper according to the present invention;
- Figure 2 shows a top view of the gripper of Figure 1;
- Figure 3 shows a bottom view of the gripper of Figure 1;
- Figure 4 shows a carousel provided with a plurality of grippers according to the invention.

[0012] With reference to the figures, the gripper, in particular for holding containers, is globally indicated with the reference number 1.

[0013] This gripper comprises a pair of mutually facing jaws 2, fastened to a support structure 3 and movable between a first operative configuration for holding the containers and a second operative configuration for releasing them, in particular operating on the neck of the containers.

[0014] Said gripper originally comprises at least a rigid element 4, preferably a rod-like body, to connect the jaws 2 kinematically and allowing their substantially simultaneous and controlled actuation. Said rigid element 4 is substantially a connecting rod having each of its ends hinged to a corresponding jaw.

[0015] Each jaw 2 is fastened to the support structure 3 by means of at least a hinge 5 and it is movable by rotation about a substantially vertical axis passing through the hinge itself. In the illustrated example, the support structure 3 whereon the gripper 1 is fastened is a rotating platform able to be used in rotary machines, in particular filling machines.

[0016] Each gripper 1 fastened to the support structure 3 is associated to actuating means comprising at least a cam (not shown herein) operatively active on only one of the jaws 2 to induce its rotation about the axis passing through the hinge 5. In particular, the jaw associated to the cam comprises at least a pin 6 positioned in correspondence with an end of said jaw and so shaped as to slide on said cam. Also present is at least an elastic element 7, preferably a spring, to maintain and/or bring back to the holding configuration the jaws 2 after the containers are released.

[0017] The pin 6 of each gripper 1 fastened to the support structure 3 is inserted within a corresponding slot 6a that allows its translation, thereby determining the rotation of the jaw about the axis that passes through hinge 5.

[0018] In an embodiment not illustrated herein, it is possible for each jaw 2 to be provided with at least an insert made of a material capable of absorbing impacts, preferably rubber, in order to allow holding fragile con-

tainers, such as glass bottles.

[0019] The operation of the invention is as follows.

[0020] The support structure 3, during its motion, alternatively brings the pins 6 of the gripper 1 in contact with the cam. In this way, the pins, sliding on the cam, translate within the corresponding slots 6a, causing the rotation of one of the jaws of each gripper about the axis passing through the hinges 5.

[0021] The motion of said jaw is transmitted to the other jaw of a same gripper by means of the rigid element 4, thereby determining the opening of the gripper 1. In particular, the rigid element 4 works substantially in traction during the opening of the gripper and substantially in compression during its closure.

[0022] Continuing with the rotation, the support structure 3 causes the pins 6 to move away from the cam, determining the closure of the gripper 1 around the neck of a container, by effect of the return force exerted by the elastic element 7.

[0023] The invention achieves important advantages.

[0024] First, the gripper according to the invention is structurally simple to build and easily operated. The actuation of the gripper is associated to one jaw only and the motion is transmitted to the other by means of the rigid element, thereby guaranteeing synchrony and symmetry in the opening and closing movements.

[0025] An additional advantage is represented by the fact that a gripper according to the invention is able to hold, acting on the neck, containers made of any material, with particular regard to PET and glass containers.

4. Gripper as claimed in claim 3, **characterised in that** it is associated to actuating means comprising at least a cam operatively active on only one of said jaws (2) to induce its rotation about said axis passing through the hinge (5).

5. Gripper as claimed in claim 4, **characterised in that** said jaw (2) associated to the cam comprises:

at least a pin (6) positioned in correspondence with an end of said jaw (2) and so shaped as to slide on said cam;

at least an elastic element (7) to maintain the jaws (2) and/or bring them back in holding configuration after the containers are released.

6. Gripper as claimed in claim 1, **characterised in that** each jaw (2) is provided with at least an insert made of a material capable of absorbing impacts to allow the holding of fragile containers.

7. Machine for processing containers, **characterised in that** it comprises at least a gripper (1) as claimed in any of the previous claims.

Claims

1. Gripper (1), in particular for holding containers, of the type comprising:

a pair of mutually facing jaws (2), fastened to a support structure (3) and movable between a first operative configuration of holding the containers and a second operative configuration of releasing the containers,

characterised in that it comprises at least a rigid element (4) to connect said jaws (2) kinetically and allow their substantially simultaneous and controlled operation.

2. Gripper as claimed in claim 1, **characterised in that** said rigid element (4) is substantially a connecting rod having each of the ends hinged to a corresponding jaws (2).

3. Gripper as claimed in claim 1, **characterised in that** each jaw (2) is fastened to the support structure (3) by means of at least a hinge (5) and is movable by rotation about a substantially vertical axis passing through the hinge (5) itself.

FIG. 1

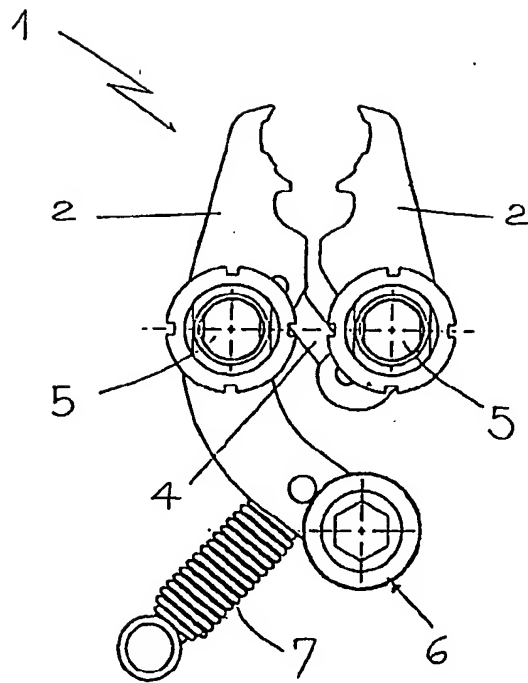
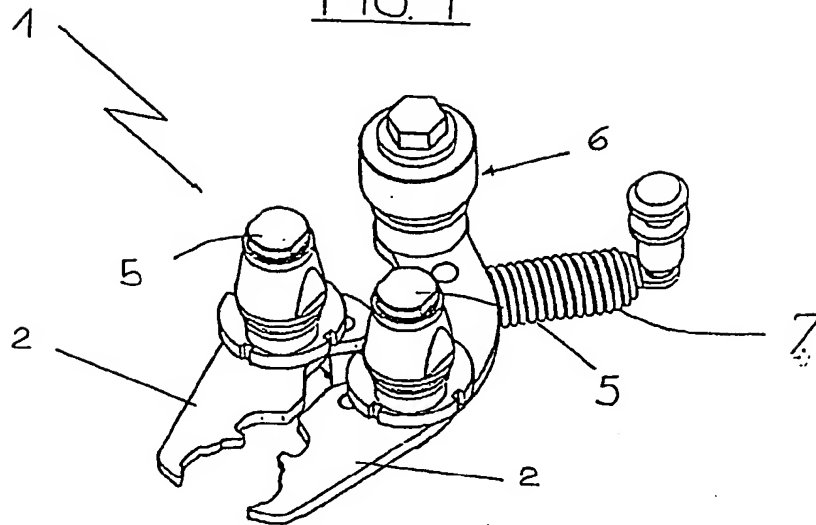


FIG. 2

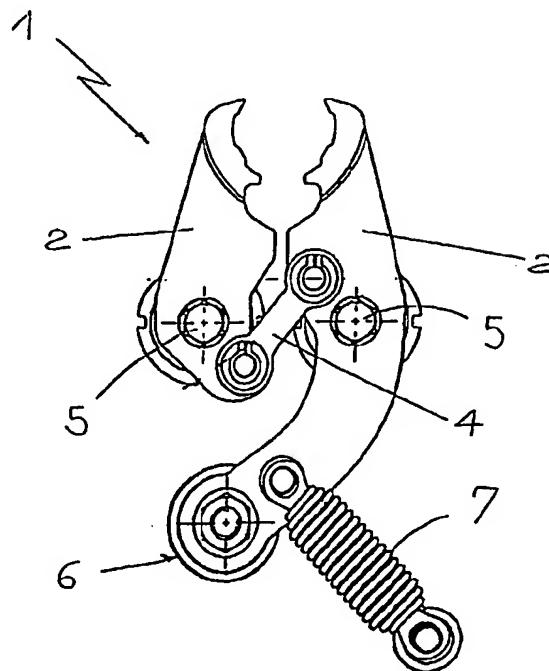
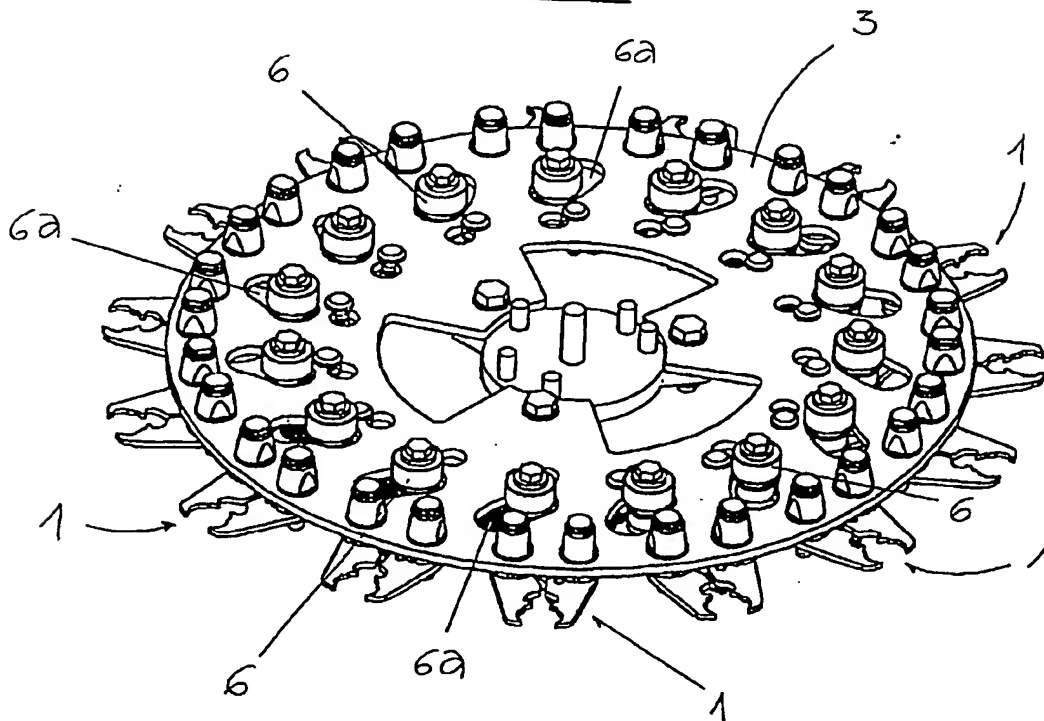


FIG. 3

FIG. 4





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EUROPEAN SEARCH REPORT

Application Number
EP 02 01 6609

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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7) B67C B08B B65G
Place of search THE HAGUE		Date of completion of the search 4 November 2002	Examiner Martínez Navarro, A.
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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